

REMARKS

Favorable reconsideration and allowance of this application are requested.

1. Discussion of Amendments

By way of the amendment instructions above, pending independent claims 1 and 16 have been amended so as to clarify that the polyacetal resin composition is a mixture or blend of (in the context of product claim 1) or is formed by mixing or blending (in the context of process claim 16) the recited components. In addition, the recited composition now requires the presence of an antioxidant, a heat stabilizer and a processing stabilizer as was originally defined by pending claim 6. The independent claims also now include with greater specificity the types of carboxylic hydrazides present in the composition, based on original claim 3.

Claims 2-3 have therefore been canceled as redundant while the remaining dependent claims have been modified as needed to conform to their respective independent claims.

Accordingly, following entry of this amendment, claims 1 and 4-19 will remain pending herein for consideration for which favorable reconsideration on the merits is solicited.

2. Response to Art-Based Rejections

A. Response to 35 USC §102(b) Rejection

Prior claims 1-8 and 13 attracted a rejection under 35 USC §102(b) as allegedly anticipated by Ishida et al (USP 3,574,786). As will become evident from the following discussion Ishida et al is inappropriate as an anticipatory reference against the presently pending claims.

Ishida et al is directed to a polyoxymethylene compositions containing 0.1 to 10% by weight based on polyacetal of a nitrogen-containing condensate obtained by polymerizing (A) at least a member selected from the group consisting of a dicarboxylic acid dihydrazide having 2-20 carbon atoms and a substance capable of affording a dicarboxylic acid dihydrazide, (B) at least a member selected from the group consisting of a diamine having 2-20 carbon atoms and a main chain consisting of hydrocarbon groups and optionally containing oxygen and polyamine, and (C) at least a member selected from the group consisting of a urea, urea derivative, thiourea and thiourea derivative, by heating at a temperature ranging from 50 to 300⁰C, for 1-20 hours in air or an inert gas, the proportion of the reactants A:B:C being a:0.1-5:0.1-10 in molar ratio. (See claim 1.)

According to Ishida et al, several dihydrazides are exemplified including dihydrazides of oxalic, maloni, succinic, adipic, pentamethylene dicarboxylic, hexamethylene dicarboxylic, cyclohexane dicarboxylic, sebacic, suberic, terephthalic, naphthalene dicarboxylic, oxadivaleric, cyclohexyl dicarboxylic, pimeric, decamethylene dicarboxylic, brassyllic, octadecane-1,18-dicarboxylic , eicosane-1,20-dicarboxylic, dimeric acids or mixtures of two or more of the same. (See column 2, line 67 to column 3, line 4.)

Preferably, Ishida et al disclose that the condensation product may be used together with antioxidants. Furthermore, Ishida et al disclose that in order to obtain a better polyacetal composition, it is desirable that light-stabilizers such as benzo-phenones and triazoles be used in combination therewith. (See column 5, lines 30-32.)

Ishida et al note that the therein disclosed embodiments allow polyacetal compositions to be made with better thermal stability, providing enhanced commercial value and utility. (See column 6, lines 3-5.)

In direct contrast, one feature of the present invention which should not be overlooked is that the present claims require a combination of a polyacetal, a *specific* carboxylic hydrazide, an antioxidant, a heat stabilizer and a processing stabilizer. Ishida et al fails to disclose such a combination. As such, Ishida et al fails to anticipate present invention under 35 USC §102(b). Withdrawal of the rejection is therefore in order.

B. Response to 35 USC §103(a) Rejection

Prior claims 1-19 attracted a rejection under 35 USC §103(a) as allegedly being “obvious”, and hence unpatentable, over Harashina (USP 6,673,405) in view of Ishida et al. Applicants respectfully disagree.

The inappropriateness of Ishida et al has already been discussed above in Section 2.A and is equally germane to the discussion which follows.

Regarding Harashina, applicants note that a polyacetal resin composition is disclosed therein which comprises a polyacetal resin, a hindered phenol-series compound, a weather (light)-resistant stabilizer, and a spiro-compound having a triazine ring. (See claim 1)

The composition may further comprise at least one member selected from a processing stabilizer and a heat stabilizer (see claim 20). The heat stabilizer includes (a) a basic nitrogen-containing compound, (b) a phosphine compound, (c) a metal salt of an organic carboxylic acid, (d) an alkaline or alkaline earth metal compound, (e) hydrotalcite, and (f) zeolite (column 12, lines 14-18).

The basic nitrogen-containing compound of Harashina et al may include an aliphatic amine (such as monoethanolamine, diethanolamine, etc.), an aromatic amine (e.g., an aromatic secondary or tertiary amine such as o-toluidine, p-toluidine, p-phenylenediamine, etc.), an amide compound (a polycarboxylic acid amide, e.g.,

malonamide, isophthaldiamide, and the like, p-aminobenzamide, etc.), a hydrazine or a derivative thereof (e.g., a hydrazine, a hydrazenen, and a hydrazide such as a polycarboxylic acid hydrazide, etc.). (column 12, lines 14-32)

Regarding the effects of the invention, Harashina discloses that:

“[The compositions] can be improved in weather (light)-resistant stability, particularly, greatly improved in degradation (or aging) caused by light after molding. Moreover, addition of a small amount of the above-mentioned components enables to suppress or inhibit formaldehyde emission from the polyacetal resin and an article thereof at extremely low level, and enables to improve excellently the circumferential environment (e.g., working environment and using environment). Furthermore, the polyacetal resin composition of the present invention can be (sic) inhibit emission of formaldehyde even under severe conditions to suppress: deposition of decomposition products on the mold (mold deposit); blooming or bleeding of such products from a shaped article; and thermal aging or deterioration of the article thus contributing, to upgrading of the quality and moldability of the shaped article.” (Column 18, lines 36-52).

As noted previously, one feature of the present invention which should not be overlooked is that the present claims require a combination of a polyacetal, a *specific* carboxylic hydrazide, an antioxidant, a heat stabilizer and a processing stabilizer. Neither Harashina nor Ishida et al disclose such a combination. Moreover, the combination of Harashina and Ishida et al would not achieve the present invention.

Ishida et al disclose a polyacetal composition containing a nitrogen-containing condensate obtained by condensing a dicarboxylichydrazide, a diamine or polyamine, and a urea of thiourea compound at 50-300⁰C. However, the relationship between the carboxylic hydrazide in the condensate and the base polyacetal is clearly different from

those in a mixture or blend of the carboxylic hydrazide and polyacetal. Moreover, Ishida et al use the special condensate, in which starting materials are reacted. Thus, one would not be motivated to use a simple carboxylic hydrazide for a polyacetal from Ishida et al. Furthermore, Ishida et al fail to disclose any processing stabilizers.

Harashina discloses a polyacetal resin composition containing a hindered phenol antioxidant, a weather or light resistant stabilizer and a spiro compound having a triazine ring, and the resin composition may contain a heat stabilizer or other additive. Although Harashina discloses a polycarboxylic hydrazide as the heat stabilizer, the polycarboxylic hydrazide is only exemplified together with other various compounds. Furthermore, Harashina is silent regarding specific examples of the carboxylic hydrazides.

Thus, even if Harashina and Ishida et al were combined in the manner suggested by the Examiner, the present invention would not result.

To further evidence the *unobviousness* of the present invention, applicants note that unexpected results are achieved. Specifically, since Ishida et al use essentially the special condensate from a view point of heat satiability of a base polyacetal, the heat stability may be improved to some extent. Furthermore, Harashina combines a polyacetal, a hindered phenol, a weather resistant stabilizer, and a special spiro compound, so as to improve the weather stability or deterioration by light of the compositions disclosed therein. However, specific properties of resin compositions (e.g., mold deposits, blooming, bleeding out or the like), when other component(s) is(are) combined with a polyacetal cannot be predicted from either of the applied references.

In contrast, according to the present invention, since the specific carboxylic hydrazide, antioxidant, heat stabilizer and processing stabilizer are combined, the heat stability and melt stability of the polyacetal base resin is improved for extruding and/or

molding processes. Moreover, formaldehyde emission is remarkably improved with the compositions of the presently claimed invention, even under severe conditions and/or even if the amount of the carboxylic hydrazide is small. Thus, mold deposit, blooming or bleeding out of the resin compositions according to the present invention are considerably improved. As such, an ordinarily skilled person would never predict such improvements even with knowledge of the applied Harashina and Ishida et al references.

Therefore, withdrawal of the rejection advanced under 35 USC §103(a) based on Harashina and Ishida et al is in order.

3. Response to Double Patent Rejection

The only issue remaining to be resolved in this application is the provisional “obviousness-type” double patenting rejection of prior claims 1-3, 5-6 and 8-19 based on commonly owned copending Application Serial No. 10/578,268 (“the ‘268 application”). Applicants request reconsideration and withdrawal of such rejection.

Specifically, applicants note that the ‘268 application defines in claim 1 a polyacetal resin composition which comprises a polyacetal resin and an aliphatic carboxylic acid hydrazide represented by the formula (1): $X-(R-C(=O)-NHNH_2)_n$ wherein X represents a hetero atom or a heteroatom-containing group having n-valence(s), R represents an alkylene group and “n” denotes an integer of 1 to 4. Claim 2 of the ‘268 application requires that, in the formula (1), the hetero atom-containing group X is a group corresponding to a hetero atom-containing compound which comprises a chain or cyclic amine, a chain or cyclic alcohol, or a chain or cyclic ether, and R is a straight or branched C₁₋₁₀ alkylene group.

Therefore, in view of the above, it is clear that the ‘268 application claims a polyacetal composition comprising a special aliphatic carboxylic hydrazide containing a

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September 24, 2008

hetero atom or a hetero atom-containing group as X in formula (1). As such, the presently amended claims are patentably distinguishable thereover. In addition, the '268 application is silent regarding the presence of an antioxidant, a heat stabilizer and a processing stabilizer.

Therefore, a clear line of patentable demarcation exists as between the claims pending in this application and the claims of the '268 application. Withdrawal of the double patenting rejection is therefore in order.

4. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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